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LOGISTICS AND MODERN WAR

BY LIEUTENANT COLONEL JOHN D. MILLETT

I

Military commanders of whatever rank—the company's captain, the regiment's colonel, the division's major general, the theater's commanding general, the chief of staff under the commander-in-chief—have never been free from supply worries. Preparations for battle have always been the greatest task of the military leader, have always demanded his most sustained attention. If campaigns have not always been won by the best prepared, wars have seldom been lost by the nation with the greatest resources in men and equipment.

Yet surprisingly enough, only passing attention is usually given to supply problems in the memoirs of the great military figures of history. Military analysts have written at length about marches, the deployment of forces, and the reduction of fortified places. Yet only a few words are given to logistics.

Von Clausewitz remarks:

> An army is like a tree. From the ground out of which it grows it draws its nourishment; if it is small it can easily be transplanted but this becomes more difficult as it increases in size. A small body of troops has also its channels, from which it draws the sustenance of life but it strikes root easily where it happens to be; not so a large army. When, therefore, we talk of the influence of the base on the operations of an army, the dimensions of the army must always serve as the scale by which to measure the magnitude of that influence.[1]

Von Clausewitz also remarks that "the system of subsistence will control the war, as far as the other conditions on which it depends permit; but when the latter are encroached upon the war will react upon the subsistence system and in such case determine the same."[2]

Vegetius remarked that an army unsupplied with corn and other necessary provisions will be vanquished without striking a blow.[3] He pointed out:

> Famine makes greater Havoc in an Army than the Enemy, and is more terrible than the Sword. Time and Opportunity may help to retrieve other Misfortunes; but where Forage and Provisions have not been carefully provided, the Evil is without Remedy. The main and principal Point in War is to secure Plenty of Provisions, and to destroy

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[1] Carl Von Clausewitz, *On War*, translated by Col. J. J. Brahom, Vol. II, p. 113.

[2] *Ibid.*, p. 101.

[3] John Clark, *Military Institutions of Vegetius*, p. 161.

> the Enemy by Famine. An exact Calculation must therefore be made, before the Commencement of the War, of the Number of Troops, and the expenses incident thereto, that the Provinces may timely furnish the Forage, Corn, and all other Kinds of Provisions demanded of them, to be transported, in more than sufficient Quantity, into the strongest and most convenient Cities, before the Opening of the Campaign. If the Provinces cannot raise their Quotas in Kind, they must compound for them in Money, to be employed in procuring all Things requisite for the Service: for the Possessions of the Subject can not otherwise be secured than by the Defence of Arms.

Napoleon is said to have had as one of his maxims "according to the laws of war, every general who loses his line of communication deserves to be shot. I understand by a line of communication that in which are the hospitals, succor for the sick, ammunition, provisions, where an army reorganizes recruits and regains in a few days' rest its morale lost by some unforeseen accident."[4] Napoleon may not have always paid attention to his own maxims, but there is at least an indication that he appreciated in part the importance of supply operations.

The leading advocate within the German General Staff of army control over the national economy, Major General Georg Thomas, wrote before 1939 that "the military-political estimate of a country's strength will in the future depend upon the estimate of its economic defense power."

No military authority has suggested that the problems of supply are necessarily the final decisive factor in war. On the other hand, it is amply evident, particularly today, that no army can wage war successfully without unlimited resources for its support in the field.

Behind all combat organization and all modern strategy lies a nation's capacity to produce and provide the weapons of war. The present war has provided many examples of brave troops whose courage and determination were inadequate against an army with superior equipment and complete control of supply lines.

II.

The problems of supply have always affected the course of military campaigns. Caesar was as famous for his road building as for his military campaigns. In fact, the two were synonymous. The Romans were only able to bring those areas north of the Po under their permanent domination as they built roads and provided permanent garrisons which could be supported in hostile territory. The inability of the Germanic tribes to organize and support large forces against the Romans explained in considerable part their failure to resist Roman conquest for four centuries.

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[4] L. E. Henry, *Napoleon War Maxims*, p. 137.

The military efforts to rescue the Holy Land from the Mohammedans were unsuccessful because individual military victories were not followed up by systematic provisions of supplies. Lodged on a hostile shore, the Crusaders were dependent upon provisions and equipment brought from Italian ports. Since there was no organization to assure this supply, the Crusades ended in complete failure.

Gustavus Adolphus was successful in his campaigns upon the European Continent during the Thirty Years' War largely because of the care which he provided for the supply of his troops on foreign soil. Indeed, it is suggested that one of the most important contributions of Gustavus Adolphus to military science was his practice of organizing depots behind his advancing troops. He saw to it that these depots were kept full from Sweden or by systematic contribution from the countries traversed. There was a regular staff of commissaries who distributed provisions to regiments in bulk. The Swedish king was himself an expert engineer and he organized a superb corps of engineers to accompany his troops and provide the necessary facilities for their support. It is said that German princes and their military captains were amazed to find "men of science" accompanying an army.[5]

The great French Marshal, Turenne, was noted for his ceaseless activity in obtaining rations for his troops. The Duke of Marlborough had a similar reputation. The long lines of wagons following his forces were a remarkable sight in his day. Such great victories as that at Blenheim could be traced in part to his enemy's conviction that he could never move a force of men to such distances from his bases in the Lowlands. This certainty was to cost the French and Austrians dearly on several occasions.

During the American Revolution General Washington was able to muster a large force for only a few days at any one time because of the lack of any means for systematic supply of his troops. One historian has noted that Washington was "forced to be a collector of supplies when he hoped to be a leader of men."[6] The equipment of the individual soldier was almost entirely what he was able to bring with him. An enlistment blank of the day enjoined the soldier to "furnish a good firearm, cartouch box, blanket, and knapsack." In place of a firearm the recruit was directed to bring a good sword or a tomahawk and later a shovel, spade, pickaxe, or scythe. Powder was always short and lead was obtained from various sources, including statues. The individual soldier molded his own bullets and manufactured cartridges. These reasons had much to do with the ineffective size and operation of the Revolutionary Army. On the other hand, British support of its forces was negligible. In order to provide food and quarters, the British were compelled to divide their forces, particularly in winter, among many different communities. In consequence, it was possible for the Americans to strike at isolated garrisons at Princeton and Trenton and thus obtain tactical victories. The only large British expedition of the whole Revolutionary War which moved any extended distance from its major base ended in complete disaster with Burgoyne's Surrender at Saratoga. The American forces under Gates at that time numbered 22,000 men but this force could have been kept together for no more than three weeks because of the supply situation.

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[5] Theodore Dodge, *Great Captains, Gustavus Adolphus.*

[6] W. A. Ganoe, *The History of the United States Army,* p. 20.

French assistance to the American cause meant even more in terms of material than it did in terms of men. Even so, there are those who say the American fight for independence was primarily successful because of the political situation in Europe rather than because of any military victory by the American Confederation of States.

Two of Napoleon's greatest defeats resulted from a complete underestimate of supply difficulties. Wellington was able to maintain his forces in the Peninsula because of his sea communications with England and his steadfast insistence upon adequate supply from the homeland. The French armies in Spain were compelled to disperse in order to forage, while Wellington, with his communications line, was able to concentrate his forces and defeat the French in piecemeal fashion. The disaster at Moscow in 1812 was almost entirely a supply defeat. If Napoleon had examined with care the success of Charles the XII in Russia he might not have made such a mistake. On each field of battle the French armies were successful against the Russians but inability to obtain supplies compelled Napoleon to retreat from Moscow and eventually to lose most of his force to the climate and Russian guerrilla tactics.

Even in British colonial wars supply organization played a major part. Kitchener's famous advance to Khartum was an advance of supply bases. He built a railroad in order to keep his force intact and supplied. The eventual defeat of the Fuzzywuzzies was a foregone conclusion.

In other words, warfare has always been affected by considerations of space and locale. These are considerations which are synonymous with supply, since the purpose of all logistical operations is to free military tactics as far as possible from the limitations of space and locale.

III.

At the end of the 18th Century two great changes occurred which were to have far-reaching effect upon the conduct of war. The French Revolution introduced the practice of large armies based upon a draft of civilians. Until this time armies traditionally had been made up of small professional groups of men. Commanders were necessarily economical in their battles since their ability to raise forces depended upon their reputation for conserving the lives of their men. It was not uncommon for the small professional armies of a European principality to be hired by some other king or noble to fight his battles. The French Revolution changed all this. The citizen army became a fundamental characteristic of modern war.

At the time of Napoleon the first steps had already been taken which were to be hailed as the industrial revolution. The growth in the use of power to operate machines brought entirely new practices in the manufacture of weapons as in the manufacture of civilian goods. Economic resources in the form of raw materials, machines, labor and transportation became more and more important to the conduct of war.

The citizen army and the industrial revolution together wrought fundamental changes in the logistical factor in warfare. Previously the accepted military maxim had been "to live off the country." This was feasible when the most important item of supply was subsistence and forage. It was equally possible as long as armies were small bodies of men. Henceforth to live off the land was no longer an acceptable military practice although this development was not entirely appreciated until well into the 19th Century.

The American Civil War demonstrated to the whole world the emerging importance of industrial power in military conflict. The Confederate states represented an agrarian economy. The North, in the long run, won the conflict because of its superior economical resources and its successful blockade of the southern states. General Lee might win battles but he could not win a war. General McClellan may have been slow and even reluctant to risk battle, but he was thorough in his organization of supply facililities. Each time he invaded the North General Lee was compelled to retire not only because of a temporary repulse at Antietam and Gettsyburg but even more because he was unable to move and supply his forces.

Sherman's campaign into the South was to demonstrate clearly the place that supply now played in war. The advance from Chattanooga upon Atlanta was a series of flanking attacks against Johnston. But each new advance was followed by a careful system of depots and supply lines supporting the Union forces. Only when Atlanta had been outflanked and captured did the Confederates suddenly move to sever Sherman's line of communications. Sherman decided upon a bold move. A part of his force was sent back to Chattanooga. With some 60,000 remaining, he marched across Georgia to Savannah where he was to be supplied from the North by sea. Before he could turn to make a junction with Grant's forces in the east he had to establish a base for his support. Savannah was a supply objective. Much has been said about how Sherman lived off the country from Atlanta to Savannah. This was an incidental phase of the campaign. General Sherman himself later related that upon the approach to Savannah he explained to General Hagen that the success of the whole campaign and the safety of the army depended upon an immediate assault upon the city and an establishment of contact with the fleet awaiting in the sound.[7]

The collapse of the southern cause in the early spring of 1865 was induced as much by supply exhaustion as by military operations. The South had been active in its efforts to organize sufficient support for its armies in the field. The interruption of trade with Europe and the virtual absence of any industrial power of its own brought about the defeat of the South.

The lessons of the American Civil War were only slowly appreciated. Such rapid campaigns as those of the Prussian Army against Denmark, Austria, and France from 1866 to 1870 overshadowed the superior preparations which had preceded the actual military operations.

The Spanish-American War was too short to do more than demonstrate the inadequacies of American military organization and our complete lack of preparedness. The even weaker position of the enemy made the outcome swift and sure.

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[7] *Memoirs of General William T. Sherman*, Vol. II, p. 183.

The Russo-Japanese War was again a lesson in the importance of supply. Afterwards the Russian commander had many observations to make about the importance of supply. The following are only a few:

> We were glued to the railway, and could not move away without risk of being left without supplies. Our field artillery and heavy four-wheeled transport carts were unable to travel over most of the hill roads. The summer rains made the movements of the army, with its heavy baggage trains and parks, extremely difficult; teams of twenty horses were harnessed to guns, and even empty carts had to be man-handled.

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> The War showed that our army organization gave us too small a percentage of actual combatants as compared with the total numbers whom we rationed. . . . Even so the number of non-combatants laid down in the establishments for each unit was not sufficient to perform the duties that fell to them, and it became necessary . . . to detail combatants for domestic duties. . . . The fighting number was never more than 75 per cent of the number of men on the strength.

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> The reason why the lines of communication in the field took so large a number away from our fighting line was that we had no proper communication units, and the large working parties necessary for the light railway, road and bridge work had to be drawn from the fighting troops. It was entirely owing to the care with which the commanding officers on the line of communications—especially those in the engineers—had been selected that we were able to fight, and at the same time to make roads of some hundreds of miles' length for inter-communication between corps.

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> The great development of science in warfare is very marked, but the late war did not display the employment of scientific forces that will be made in a struggle between two European powers. . . . The speedy construction of strong fortifications, the laying of railways (especially of field railways) and construction of metalled roads, the organization of aerial and wireless telegraphy, of signalling by heliograph, lamps, and flags, the employment of balloons, motors, and bicycles, are all duties for which the demand increases every day, while the great quantity also of artificial obstacles, wires, mines, hand-grenades, explosives, reserves of entrenching tools, etc., now required must exist ready for use in large quantities. A much larger number of engineer troops, including sappers, telegraph and railway units, than we had available in Manchuria is necessary, in order that all this technical equipment may be used to the best advantage.

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> The security of our communications was literally vital, for even their temporary disorganization meant catastrophe. Not only the flow of reinforcements to the front, but the collection and distribution of local supplies would have ceased. As we were over 5,300 miles away from our base (Russia), we had been forced to form a local supply base and the loss of this would have threatened the army with starvation.[8]

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[8] General A. N. Kuropatkin, *The Russian Army and the Japanese War*, translated by Capt. A. D. Lindsay and edited by Maj. E. D. Swinton, Vol. II, pp. 33, 44-5, 50-1, 141, and 322.

IV

The First World War in one sense demonstrated the logical consequence of civilian armies and industrial power—total mobilization. *The War Memoirs* of David Lloyd George vividly portrayed the steps necessary to mobilize all the economic resources for war—industry, agriculture, labor, and transportation.

When the United States entered the war against Germany in April 1917, our industrial preparation was negligible. The American forces eventually sent to France received almost all of their heavy equipment from the British and the French governments. On a tonnage basis the report of the Services of Supply at the end of the war showed that 51 per cent of all supplies for the AEF were provdied by our Allies. The most important items received from the United States were foodstuffs and miscellaneous quartermaster supplies. All heavy artillery pieces and all combat airplanes were provided by the British and French. At the end of the war American munitions were just beginning to flow on a large scale from American factories. It was America's manpower, however, and not American supplies which turned the tide in World War I. British mobilization of industrial resources outran her manpower resources.

The Assistant Secretary of War in 1917-1919, Benedict Crowell, observed:

> The really amazing thing which America did was to place in France in 19 months an army of the size and the ability of the American Expeditionary Force. The war taught us that America can organize, train, and transport troops of a superior sort at a rate which leaves far behind any program for the manufacture of munitions. It upset the previous opinion that adequate military preparedness is largely a question of trained man power. . . . The experience of 1917 and 1918 was a lesson in the time it takes to determine types, create designs, provide facilities, and establish manufacture.[9]

The nations of the world learned the importance of industrial preparedness as a result of the experience in World War I. In the United States this demonstration led Congress to confer upon the War Department responsibility for planning for the industrial mobilization of the nation's resources for the eventuality of another war. Far-reaching steps to put America's military forces and industrial resources in a state of preparedness were taken between June 1940 and December 1941.

World War II has demonstrated the interlocking considerations of strategy and logistics. The great objectives of German military operations were the economic resources of the European continent to support her own military production. The determination to attack Russia in the summer of 1941, often hailed as Hitler's greatest mistake, was to a great degree dictated by logistical considerations. It is altogether probable that the Japanese decision to attack the United States was prompted by the measures taken to curtail essential raw materials for the support of Japan's war in China.

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[9] *America's Munitions, 1917-1918,* pp. 17-18.

After the entry of the United States into the war against the Axis, joint British-American strategy was determined by logistical factors. Japan's rapid advance throughout the Pacific area and Malaysia went unchecked except temporarily on Bataan because of Allied inability to move men and supplies into the area. Eventually it was decided to launch the major blows upon the Axis directly against Germany for the simple reason that England was available as a base for the attack. Here were large sources of supplies which did not have to be transported for the British Army. The distance of British ports from the United States was only half the distance of Australian ports. The capacity to unload and handle supplies in England was far superior to that available in Australia. These considerations made deployment of a major striking force in Europe possible far sooner than in the Pacific. There a holding action with individual tactical offensives was the only alternative because of the logistical situation.

World War II was a struggle of economic forces as well as military forces. The sinews of war were not the muscles of a soldier but the labor of a nation.

The first essential in the logistics of modern war is the adequate procurement of supplies. The production of military equipment requires industrial facilities, raw materials, and labor. The provision of all of these takes time. It is impossible when a nation does not have the resources with which to begin in the first place.

Although the United States had begun to convert her industrial resources to the output of munitions before December 7, 1941, the progress made was inadequate to meet the immediate needs when this country was attacked. General Marshall summarized the situation in these words:

> On all the fighting fronts the Allies were in a desperate situation due to lack of adequate materiel while facing an enemy who possessed an abundance of the most modern equipment conceived at that time. The trying problem of the War Department was to meet the urgent necessities of critical fronts without jeopardy to the security of continental United States. Money in large appropriations had been made available but not available was the time in which to convert this money into munitions ready for issue.

The broad problems of procurement in war time may be divided into three major categories—the division of a nation's output, the role of the military in procurement operations, and the distribution system.

The first great problem is the division of the nation's economic resources between the armed forces, the immediate production for maintaining direct war output, and the production necessary to sustain the civilian population producing war goods. The calculation of war requirements is an indispensable feature to the planning which results in a division of national resources. Industrial facilities, raw materials, and manpower must all be divided. Under conditions of total war there cannot be war competition between the armed forces and the civilian population. All are a part of the war effort. Adjustments are nonetheless possible which affect the type of war to be waged, the strategy for its successful completion, and its duration.

When the requirements for the U. S. Army were first calculated on a complete basis after Pearl Harbor, it was evident that the American economy would be unable to provide the necessary supplies and equipment. Considerable adjustments then followed which reduced the number of armored divisions and later the entire size of the Army.

The second great problem in procurement was to determine the role of the War Department in managing the resources made available for war production. Because of the close interrelationship between strategy and logistics, even to the point of modification of weapons to meet particular tactical needs, the War Department had its own organization for the purchase and manufacture of supplies. The War Department asked the right to control the utilization made of its share of national resources. This problem revealed itself in the machinery established for the control of raw materials, the scheduling of production, and the utilization of labor. Eventually satisfactory lines of mutual cooperation were worked out between the great civilian agencies controlling the mobilization of economic resources as a whole and the War Department controlling the procurement of specific military supplies.

In the third place, the distribution system for the supplies of the Army had a vital relationship to procurement. Inventories maintained within the United States to insure the continuous flow of supplies to troops affected military requirements. Moreover, the prompt location of supplies wherever they might be was essential in order to meet troop

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[10] *Biennial Report of the Chief of Staff of the United States Army to the Secretary of War, July 1, 1941-June 30, 1943,* pp. 6-7.

demands. In other words, the efficient utilization of the production made possible by the resources available for war production required an adequate system of distribution. The two could not be divorced.

There were incidental aspects to procurement which proved troublesome during the war effort—price control, renegotiation of contracts, disposal of surplus properties, and the termination of contracts.

Constant research and development were essential to the improvement of war materiel. This continued throughout the war effort. Within three years after Pearl Harbor there was scarcely a single weapon that remained unchanged. Nonetheless, research and development was the qualitative aspect of what remained throughout the war essentially a quantitative problem.

VII.

The protection of the United States on battlefields thousands of miles from our continental limits focused particular attention upon transportation. From the beginning of the war the merchant marine available for the movement of troops and supplies became the key factor in military operations. This situation is evident from the determined onslaught by the Axis upon shipping lines and port facilities. Not until effective countermethods had been devised for submarine and aerial attack could the Allies support a sustained military offensive.

Many devices were used to conquer transportation defects. The United States shipped many of its supplies unassembled in order to preserve shipping space. Constant pressure was exerted to provide full loads. Deck spaces were utilized to the fullest extent.

Landing ships were built and used to haul supplies over short distances in combat readiness. This helped avoid the tie-up of transport vessels in large-scale military movement until they could be efficiently used. Strict limits were required to reduce the haul of unnecessary items. Balance was necessary between lifting capacity for supplies and lifting capacity for troops. In some instances pre-shipment was resorted to build up overseas supply areas in anticipation of future large-scale military operations. A close integration was essential between the distribution machinery and transportation machinery. This was achieved in the supply system of the War Department during the war.

All the great conferences of military leaders throughout the war determined military strategy in the light of transportation possibilities. In his 1943 report to the Secretary of War the Chief of Staff of the

American Army reported that the Casablanca Conference "covered strategic plans throughout the world, a careful breakdown of ship tonnage allotments, convoy movements, naval dispositions, etc."[11]

Time was essential to transportation. Military operations had to be scheduled as transportation conditions permitted. The attack upon Sicily, for example, was originally planned before the final completion of the North African campaign. An inability to provide the necessary transportation compelled a postponement of D-Day. Later the Commander-in-Chief of the North Africa Theater of Operations estimated that if one additional division could have been transported to Sicily, the escape of the Germans after their defeat there could have been prevented.

Transportation limitations affected strategic decisions in other ways. The military planners for the North African operation had to choose between a large assault force without its trucks and other wheeled vehicles or a smaller force fully equipped with all of its vehicles for inland movement. The decision was made in favor of a large assault force. The initial success in taking all objectives was followed by a period of inactivity until means of inland movement could be transported to North Africa.

Finally, no surer evidence of the importance of transportation to modern war can be assembled than the continuing attention given by both sides to interruption of transportation facilities.

VIII.

In the last place, supply is a problem of movement overseas wherever troops operate against the enemy. Amphibious warfare has emphasized the problem of bases, ports, and supply lines immediately behind combat troops. Supplies must be unloaded and strengthened in preparation for an assault upon the enemy. No military operation is possible until adequate buildup has taken place close to the expected scene of conflict. Much has been said about the new elements of warfare introduced by the airplane. This is true. Yet, the success of the airplane in use against the enemy is dependent upon ground transportation. This has been amply demonstrated in the difficulties in supporting active aerial operations against the Japanese in China.

In commenting about the shift of aerial operations from the Philippines to Australia early in 1942, the Chief of Staff pointed out:

> While this sudden reversal of a movement half way around the earth demonstrated

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[11] Biennial Report, *op. cit.*, p. 43.

the mobility of the airplane, it also demonstrated the lack of mobility of air forces until a lengthy process of building up ground service forces and supplies (mechanics, ordnance and radio technicians, signal personnel, radar warning detachments, antiaircraft, medical, and quartermaster units, as well as the troops to capture airfields and defend them against land attack, and the accumulation of repair machinery, gasoline, bombs, and ammunition) had been laboriously completed by transport plane, passenger and cargo ship—the last two largely being slow-moving means of transportation. The planes flew to Australia in 10 days. The ground units and materiel to service the planes and keep them flying required approximately 2½ months or longer for the transfer.[12]

Bases are as essential to the movement of supplies as they are to aerial operations. As troops advance, supply lines must continue to follow. As already mentioned above, the forces originally landing in North Africa on November 8, 1942 were unable after the seizure of Oran and Algiers to advance into Tunisia. The occupation of that area by the Germans could not be prevented because the forces necessary could not be moved and kept supplied. Advancing patrols came within 60 miles of Tunis by November 16 and were within 30 miles by November 25. The nearest ports to supply this force were Bone and Phillippeville. The eventual defeat of the Germans in Tunisia was made possible only by the construction of rail and road facilities which moved men and supplies in sufficient force against the enemy. Ten gasoline pipelines were constructed before the attack began. This was a single illustration of the essentials for modern war.

In the Pacific, where ports have been unavailable, amphibious trucks had to be used to unload supplies. Landing craft likewise provided a means for direct support of military operations. One by one new points of operations were found and kept supplied by a constant stream of vessels. Thus coastwise traffic in the Southwest Pacific took the place of inland traffic characteristic of military campaigns in North Africa and Europe. In both cases continuing flow of supplies was indispensable to successful operation against the enemy. Sustained pressure was only possible when a sustained flow of supplies was assured.

The delivery of supplies to troops in combat presented far-reaching difficulties. Yet any slow-up was immediately evident on the fighting lines themselves.

IX.

The experience of the Second World War has demonstrated certain lessons which must be borne in mind by future generations if military defeat for this country is to be avoided.

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[12] Biennial Report, *op. cit.*, p. 5.

The first of these lessons is the importance of industrial preparedness. Military training and an adequate military force are of little avail without industrial facilities and organization capable of supporting the forces to be put in the field. War is an insatiable consumer of supplies. Heavy equipment such as military airplanes, mobile weapons, communications equipment, and ammunition have few civilian counterparts. We have learned that 18 months is only time to plan the conversion of an economy from peacetime output to defense output when we must begin from zero. American industrial potential has swung the balance in World War II against Germany because, thanks first to Britain and then to Russia, we had the time to make our great industrial might effective. Will that time always be available? May not a future aggressor aim his initial blows at destroying the industrial potential of the United States before those resources can be marshalled against him?

In the second place, supply and strategic considerations have today become so intertwined that no line of demarkation is possible. Total war knows no differentiation between military economy and civilian economy. Unless victory is to be jeopardized, all resources must be used for war. This is not to say that all resources are to be used for the output of immediate war goods. The nation's transportation system must be maintained, its health guarded, adequate housing assured, some recreation provided. These are indispensable to the continued sustained output of military supplies. Nonetheless, military organization must assume a large responsibility for the control of economic resources if military needs are to be translated at once into procurement performance.

World War II has demonstrated a practical line of division of authority. Just as the Commander-in-Chief is a civilian under the American democratic system, so the war direction of a nation's economic resources is entrusted to civilian agencies. But within that area of total resources allotted to military use, military authorities themselves should maintain complete control. That there should be constant check on how these resources are used is desirable. Criticism can serve a helpful purpose. Responsibility, however, should remain with the same individuals who must achieve military success.

In the third place, procurement without a completely adequate distribution system is of little avail. Supplies must be moved and moved promptly. Waste in the accumulation of large inventories means ineffective military operations. Waste in accumulated supplies that cannot be properly identified and moved when desired means ineffective military operations. Distribution and procurement are so interlocked that it has not been uncommon for certain supplies to move directly from production lines to ports of embarkation. One organization must direct procurement and distribution and insure that both function efficiently. It has been evident in World War II that distribution experience reflecting the demands of troops is an important element in the determination of military requirements. No advance planning can fully take the place of distribution experience.

In the fourth place, American defense is dependent upon its overseas transportation facilities. If once an enemy is permitted to occupy American soil and sustain an attack upon our continental territory, the prospects of successful resistance are meager. America depends upon her foreign outposts and those foreign outposts can only be maintained with adequate control of the sea. This means not only naval power but also the vesesls to move troops and supplies. This lesson was amply demonstrated by the attack by Japan upon the Philippines in 1941. The use of England as a base for the defeat of Germany on the soil of France, the Lowlands, and Germany was made possible by our transportation system. The American attack upon Pacific bases gathered momentum as increased transportation facilities became available. Supplies must be moved overseas and until the day when the airplane can take over the whole burden, the United States is dependent upon its merchant marine for successful defense.

In the fifth place, military operations overseas are dependent upon their own supply machinery. Supplies unloaded from the United States must be stored until needed and then promptly moved in support of military attack. No Army can afford to ignore the machinery available to it for its constant support. Depots, railroads, roads, trucks, pipelines—all these come increasingly indispensable as troops move away from coastal bases. When water rather than land is the means of communications, one base serves as the supply point for the next area of operation. The job of logistics is to make possible the free movement of troops and free them from the limitations of time and space.

If these lessons are fully appreciated not only by our military leaders of tomorrow but also by an alert citizenry, the United States may look forward to its future security with reasonable assurance.